VT-HMI 5101

User's Manual

Vantron Technology

www.vantrontech.com

All Rights Reserved

Revision History:

No.	Version	Description	Date
1	V1.0	First release	Apr. 25, 2008
2	V1.1	Update Ordering Information	Sept. 17, 2008
3	V1.2	Add VESA Information	Jan. 25, 2010

Table of Contents

1 Foreword....1
1.1 Copyright Notice....1
1.2 Notes....2
1.3 Statement....2
1.4 Disclaimer....3
1.5 Limitation of Liability/Non-warranty....3
1.6 Safety Instructions....3
1.7 Precautions....4
1.8 Safety Instructions for Power Cables and Accessories....5
2 Overview....7
2.1 Introduction....7
2.2 Product Series....8
2.2.1 Product Order Coding Rule....8
2.2.2 Ordering Information....9
3 VT-HMI-5101 Hardware Instructions....10
3.1 Product Appearance....10
3.2 Specifications....11
3.3 Interface Instructions....13
3.3.1 Bottom View....13
3.3.2 Left View....14
3.4 Dimension....15
3.5 Hardware Installation....16
3.6 Interface Description....17
3.6.1 DC24V Power Input....17

3.6.2 Ethernet Interface 18
3.6.3 D Sub-9 RS232 Connector 19
3.6.4 USB Host Connector 20
3.6.5 CAN Connector 20
3.7 I/O Interface Instructions 21
3.7.1 RS485/422 21
3.8 Packing List 23
4 Software Instructions 24
4.1 Brief Introduction 24
4.1.1 Serial Port Instructions 24
4.2 WinCE Instructions 25
4.2.1 Windows CE Application Development 25
4.2.2 Windows CE Firmware Update 25
4.2.3 Instructions for Windows CE Configuration Files 27
4.2.4 Notice of Touch Screen in WinCE 29
4.3 Linux Instructions 31
4.3.1 Linux Application Development 31
4.3.2 Linux Image Programming 32
4.3.3 Instructions for Linux Configuration Files 34
4.3.4 start.txt 34
4.3.5 tty_config.txt 34
4.3.6 hw_config.txt 35
4.3.7 root_config.txt 35
4.3.8 Notice of Touch Screen in Linux 36
5 Tips 37

1 Foreword

1.1 Copyright Notice

While all information contained herein have been carefully checked to assure its accuracy in technical details and printing, Vantron assumes no responsibility resulting from any error or features of this manual, or from improper uses of this manual or the software. Please contact our technical department for relevant operation solutions if there is any problem that cannot be solved according to this manual.

Vantron reserves all rights of this manual, including the right to change the content, form, product features, and specifications contained herein at any time without prior notice. The latest version of this manual is at www.vantrontech.com.cn. Please contact Vantron for further information:

Vantron Technology（Vantron）
E-mail: sales@vantrontech.com

The trademarks and registered trademarks in this manual are properties of their respective owners. No part of this manual may be copied, reproduced, translated or sold. No changes or other purposes are permitted without the prior written consent of Vantron.

Vantron reserves the right of all publicly-released copies of this manual.

1.2 Notes

Applicable notes are listed in the following table:

Sign	Notice Type	Description
	Notice	Important information and regulations
	Caution	Caution for latent damage to system or harm to personnel

1.3 Statement

It is recommended to read and comply with this manual before operating VT-HMI which provides important guidance and helps decreasing the danger of injury, electric shock, fire, or any damage to the device.

1.4 Disclaimer

Vantron assumes no legal liability of accidents resulting from failure of conforming to the safety instructions.

1.5 Limitation of Liability/Non-warranty

For direct or indirect damage to this device or other devices of Vantron caused by failure of conforming to this manual or the safety instructions on device label, Vantron assumes neither warranty nor legal liability even if the device is still under warranty.

1.6 Safety Instructions

- ✧ Keep and comply with all operation instructions, warnings, and information.
- ✧ Pay attention to warnings on this device.
- ✧ Read the following precautions so as to decrease the danger of injury, electric shock, fire, or any damage to the device.

1.7 Precautions

- ✧ Pay attention to the product labels/safety instructions printed on silk screens.
- ✧ Do not try repairing this product unless declared in this manual.
- ✧ Keep away from heat source, such as heater, heat dissipater, or engine casing.
- ✧ Do not insert other items into the slot (if any) of this device.
  - Keep the ventilation slot ventilated for cooling.
  - System fault may arise if other items are inserted into this device.
- ✧ Installation: ensure correct installation according to instructions from the manufacturer with recommended installation tools.
- ✧ Ensure ventilation and smoothness according to relevant ventilation standard.

1.8 Safety Instructions for Power Cables and Accessories

Proper power source only

Start only with power source that satisfies voltage label and the voltage necessary according to this manual. Please contact technical support personnel of Vantron for any uncertainty about the requirements of necessary power source.

Use tested power source

This product still contains a button lithium battery as a real-time clock after its external power source is removed and therefore should not be short-circuited during transportation or placed under high temperature.

Place cables properly:

Do not place cables at any place with extrusion danger.

Cleaning Instructions

- Please power off before cleaning the device.
- Do not use spray detergent.
- Clean with a damp cloth.
- Do not try cleaning exposed electronic components unless with a dust collector.
- Support for special fault: Power off and contact technical support personnel of Vantron in case of the following faults:
  - The device is damaged.
  - The temperature is excessively high.
  - Fault is still not solved after the operation according to the manual.

2 Overview

2.1 Introduction

Thank you for choosing Vantron. It is our commitment to provide our valued customers with the embedded devices equipped with the state-of-the-art technology and the best product services.

HMI, the abbreviation for Human-Machine Interface, enables the interaction between operators/users and applications, connects industrial control products such as PLC, transducer, DC speed regulator, meter, etc. HMI adopts a display for displaying and input units such as touch screen, keyboard, mouse, etc. for writing working parameters or inputting operation commands. As a digital device for realizing information interaction between human and machine, HMI is composed of hardware and software. Based on its ample function interfaces and powerful user operational interface, it is very suitable for control units such as medical device, intelligent transportation, industrial field, etc..

Vantron's VT-HMI products are based on the most advanced ARM and Intel Atom processors and have low-power consumption and high integration. The products are designed for applications such as industrials, medicals, and transportations etc..

2.2 Product Series

2.2.1 Product Order Coding Rule

VT-HMI- A BB C:

Type suffix:

1: Basic type;

2: Enhanced type or other types

Screen size:

07、08、10、15: for LCD in 7、8、10、15 inches.

Product series:

3：PXA270 ARM10 processor platform

5：IMX31 ARM11 processor platform

6：Intel ATOM x86 processor platform

2.2.2 Ordering Information

Series 3: PXA 270 ARM10 processor based

VT-HMI-3081	8.4" TFT, PXA270 520MHz, Ethernet, RS232, RS422/485, USBH, USBD
VT-HMI-3082	8.4" TFT, PXA270 520MHz, Ethernet, 5xRS232, 2xRS422, RS485, 4xUSBH, CAN
VT-HMI-3101	10.4" TFT, PXA270 520MHz, Ethernet, RS232, RS422/485, USBH, USBD
VT-HMI-3102	10.4" TFT, PXA270 520MHz, Ethernet, 5xRS232, 2xRS422, RS485, 4xUSBH, CAN, VGA

Series 5: iMX31 ARM11 processor based

VT-HMI-5071	7" TFT, 16:9 Wide Screen, iMX31 532MHz, Ethernet, RS232, RS422/485, USBH2.0
VT-HMI-5101	10.2" TFT, 16:9 Wide Screen, iMX31 532MHz, Ethernet, RS232, RS422/485, USBH2.0

Series 6: x86 processor based

VT-HMI-6101-1	10.4" TFT, ATOM 1.1GHz, 512MB, 1000M Ethernet, RS232, RS422/485, 4xUSBH2.0
VT-HMI-6101-2	10.4" TFT, ATOM 1.6GHz, 512MB, 1000M Ethernet, RS232, RS422/485, 4xUSBH2.0
VT-HMI-6151-1	15.1" TFT, ATOM 1.1GHz, 512MB, 1000M Ethernet, RS232, RS422/485, 4xUSBH2.0
VT-HMI-6151-2	15.1" TFT, ATOM 1.6GHz, 512MB, 1000M Ethernet, RS232, RS422/485, 4xUSBH2.0

3 VT-HMI-5101 Hardware Instructions

3.1 Product Appearance

Front & Side View

Top View

Back & Side View

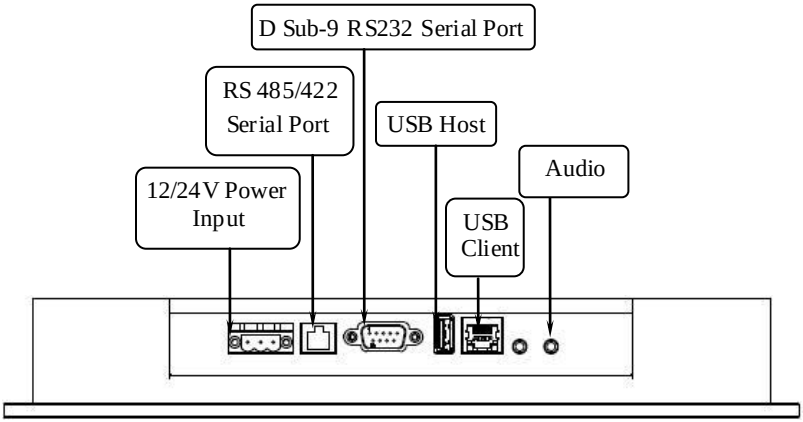
3.2 Specifications

CPU	Processor	FreeScale iMX31,ARM11,
Memory	On Board RAM	DDR 128MB(up to 256MB),
	On Board ROM	32MB Nor Flash
	External	1x MMC/SD, USB 2.0 Storage
Display	Resolution	10.2", 16:9 LVDS LCD,1024 x 600
	Contrast	500:1
	Brightness	220 cd/m2
	View Angle	65U/65D,70L/70R
	Touch Screen	4 Wires resistance type, Hardness, 4H
Interfaces	Ethernet	10/100-BaseT
	USB	1xUSB2.0 Host
	COM Port	1xRS232(DB9),
		1 x CAN 2.0b
	Audio	1xMIC in 3.5mm, 1xSpeak Out 3.5mm
	Alarm	Buzzer Out
	Printer Port	Printer in USB Interface
	RTC	Supported
Software	OS	WinCE 5.0/6.0, or Linux 2.6
	Applications	Provide SDK, support MCGS tool
Power	Input	DC24V (8-36V)
	Consumption	9.25W

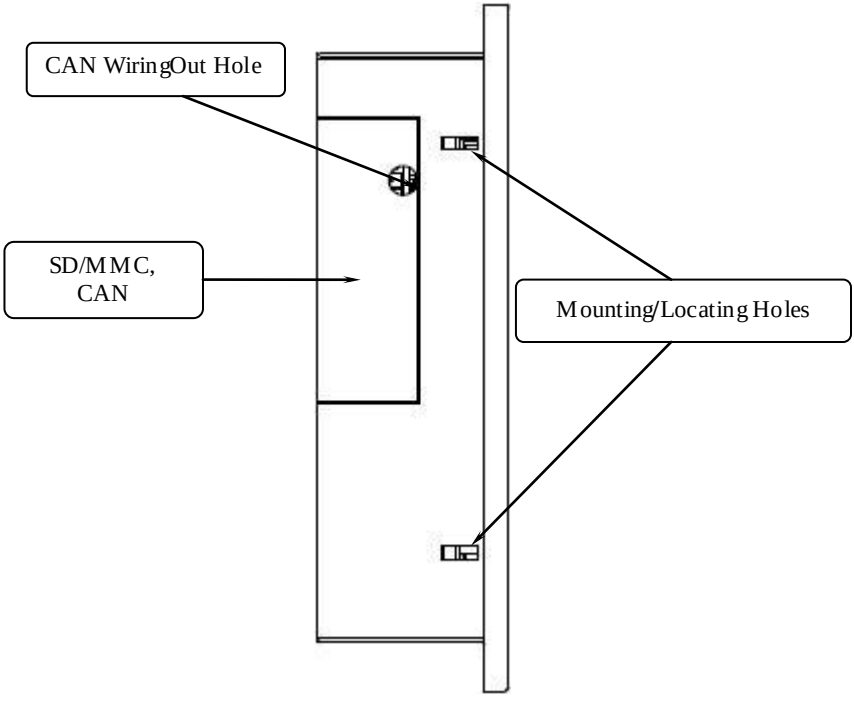
Mechanical	Dimensions	315x222 x47mm
	Install Window	294x201 mm
	VESA Install	75x75mm, 3mm Screw
	Weight	2.4Kg
	Enclosure	Aluminum Alloy with Black Color (optional for other colors)
Environment Condition	Temperature	Operating:-10℃ ~ +60℃ (ETR:-30℃ ~ +70℃ Optional)
		Storage: -20℃ ~ +70℃, (ETR:-40℃ ~ +80℃ Optional)
	Humidity	10-85%RH (Non-Condensation), operating and storage
	Vibration	2G, 9-26Hz (10 times in X,Y,Z directions)
	Protection	Front Panel: IP54 (IP65
	Cooling Mode	Fanless
	Certifications	FCC and CE

3.3 Interface Instructions

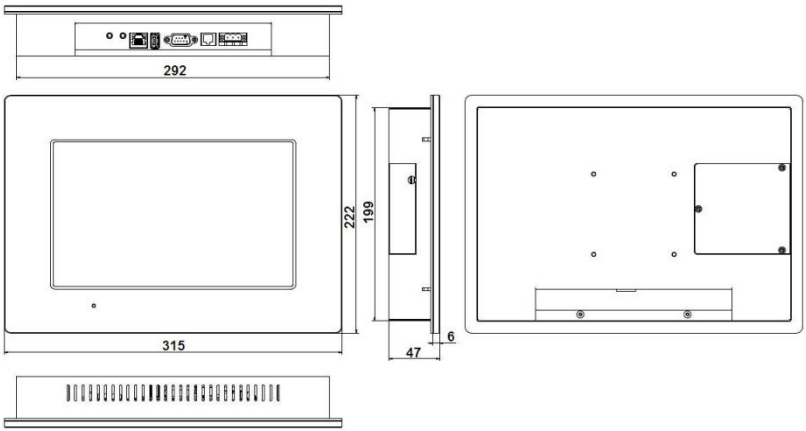
3.3.1 Bottom View



3.3.2 Left View



3.4 Dimension

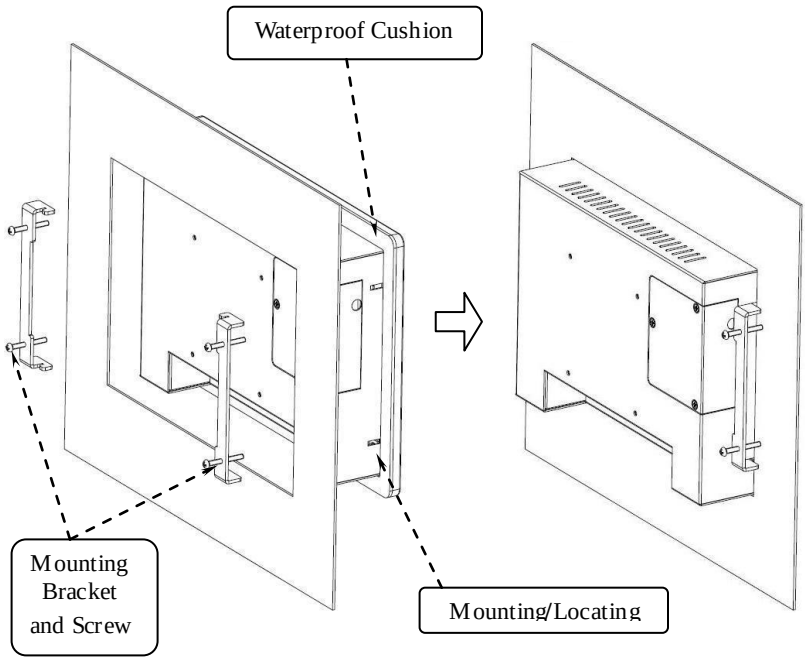


Mounting Window Size: 294x201mm

3.5 Hardware Installation

The product supports standard VESA mounting (75 x 75mm xΦ3mm) as well as side mounting.

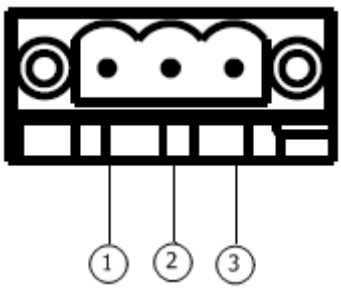
The left and right sides of the device housing have two mounting slots respectively for inserting mounting brackets to needed positions by tightening screws (as shown below):



3.6 Interface Description

3.6.1 DC24V Power Input

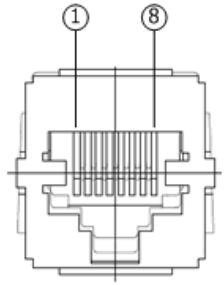
3 pins 5.08mm pitch terminal with screw lock



Pin	Description
1	GND（power ground）
2	Power (+24V DC +)
3	Protection Ground

3.6.2 Ethernet Interface

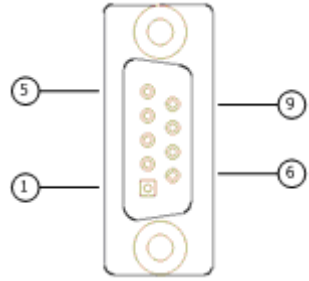
Standard RJ45 interface, supporting 10M/100M self-adaptation



Pin	Description
1	TX+
2	TX-
3	RX+
4	N.C.
5	N.C.
6	RX-
7	N.C.
8	N.C.

3.6.3 D Sub-9 RS232 Connector

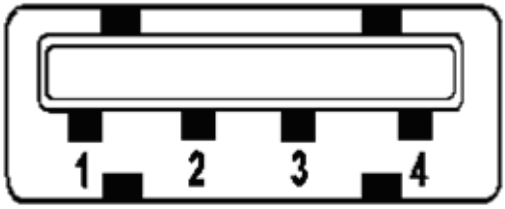
Standard vertical DB-9 male connector, baud rate up to 921,600bps



Pin	Description
1	DCD
2	RXD
3	TXD
4	DTR
5	GND (ground pin)
6	DSR
7	RTS
8	CTS
9	RI

3.6.4 USB Host Connector

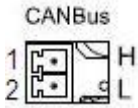
Standard USB host connector, type A



Pin	Description
1	USB VCC
2	USB NEG
3	USB POS
4	GND

3.6.5 CAN Connector

2 Pins 3.81mm pitch terminal

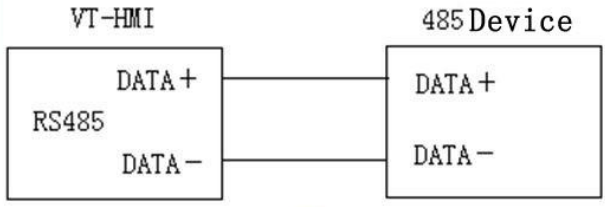


Pin	Description
1	CANH
2	CANL

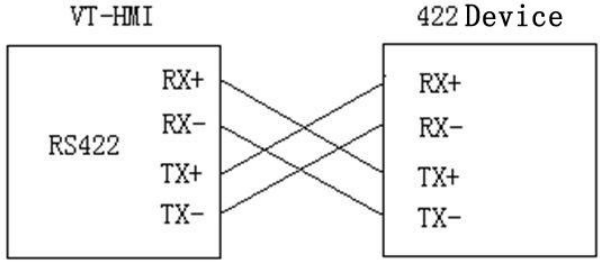
3.7 I/O Interface Instructions

3.7.1 RS485/422

3.7.1.1 485 Cable Connection



3.7.1.2 422 Cable Connection

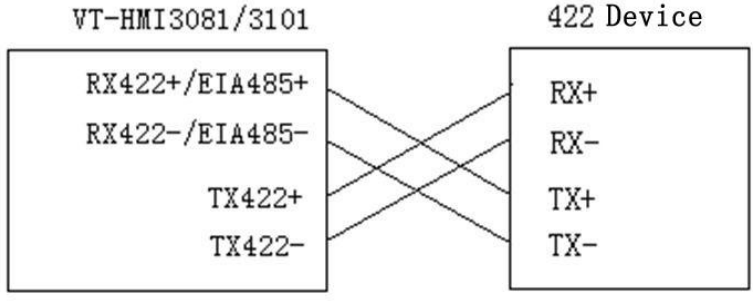


3.7.1.3 RS422/485

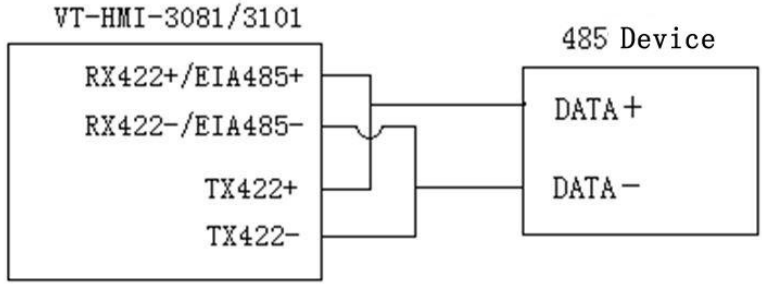
RS422 and RS485 share the same RJ11 interface, and the electrical

properties thereof are determined according to different connection modes.

- RS 422 wiring suggestion



- RS 485 wiring suggestion



3.8 Packing List

No	Part Description	Quantity	Type
1	Install Mechanical tools	1pcs	140040-0017EV, VANTRON
2	Cushion for Enclosure's Front Panel Protection	1pc	140010-0036EV, VANTRON
3	Screw, Mounting Enclosure	4pcs	250010-01001EV, VANTRON
4	Power Terminal	1pc (3pins)	210071-01041EV, ANYTEC:VM-5.08-3P
5	CAN Bus Terminal (Optional)	1pc (3pins)	210060-0103BEV, ANYTEK:VM-3.81-3P

4 Software Instructions

4.1 Brief Introduction

VT-HMI-3081 has been pre-loaded with WinCE5.0 or embedded Linux image, so that the system can automatically run WinCE 5.0 or embedded Linux when powered up.

4.1.1 Serial Port Instructions

- VT-HMI-5101

As a default debug serial port, COM1 cannot be used by application software normally. But it can be used after the debug serial port is set to 0 or other ports, by setting DebugPort parameters in ADSLOAD.HWT (see 4.2.3.1).

- RS485/422 is COM3.

4.2 WinCE Instructions

4.2.1 Windows CE Application Development

4.2.1.1 Development Environment

To create Win32 and MFC applications with EVC4.0 and create Win32, MFC and C# applications with VS2003、VS2005 and VS2008, the integrated development environment (IDE) can be purchased from the agents of Microsoft Company.

4.2.2 Windows CE Firmware Update

1） Copy Bootloader (adsload.rom), configuration files (adsload.hwt/adsload. Reg), OS image (nk.bin), and background pictures (adsload.bmp) to the root directory of SD card.

2） Insert the SD card to relevant slot.

3） Power on so that the system can automatically read and update relevant files from the SD card. The updating process can be observed via the debug serial port. The system continues operating after the updating.

4） Power off.

5） Take out the SD card and delete files stored therein.

6） Power on so that the updated items can automatically load and operate.

Cautions:

1. It is our strong suggestion to update firmware carefully because this product recognizes firmware only according to firmware name. Therefore, it is a must to ensure that firmware in the SD card is the required one. You may have to return the product to Vantron for maintenance if the updating of Bootloader（adsload.rom）fails, which may cause loss of time and money.

2. Do not power off during updating.

4.2.3 Instructions for Windows CE Configuration Files

Windows CE has two configuration files （adsload.hwt/adsload.reg） that can be modified according to your own needs. It is recommended to use configuration files with our technical support. Instructions are listed below:

4.2.3.1 Adsload.HWT

Hardware configuration files can be opened by text editor and you therefore only need the following items and keep other items as hardware compatible settings, the keywords and values of which should be separated by one or more spaces.

[TAGS]

MouseDetect 0x01

DebugPort 0x01

BootLogo 0x02

LogoBckGround 0x3B74

- MouseDetect——1: the mouse arrow can be seen after OS is started; 0: other values are invalid without mouse arrow.
- DebugPort——designate serial port for debugging (default serial port 1); 0: without debug serial port.
- BootLogo——0: Bootloader dose not display Logo; 1: display Logo consolidated in system; 2: display Adsload.bmp (24bits or 16bits of bitmap files only)
- LogoBckGround——designate background color (RGB565 format) of Logo displayed in Bootloader.

4.2.3.2 Adsload.REG

User's registry files can be opened by text editor and are standardized, for example:

[HKEY_LOCAL_MACHINE\SOFTWARE\CERDISP]

"HostName"="192.168.8.88"

"RefreshTime"=dword: 32

"AllowRemote"=dword: 0

The system automatically loads when started and you can add system registry information therein according to your own needs.

Notice: The last row of this file must be followed by an Enter.

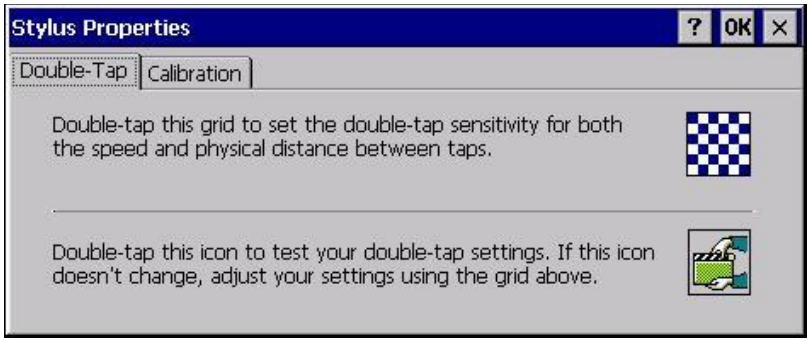
4.2.4 Notice of Touch Screen in WinCE

4.2.4.1 Touch Screen Calibration

To get better touch precision, you need to calibrate before using the touch screen. The calibration comprises steps of selecting “Start\Settings\Control Panel” to step into the control panel interface, tapping

icon to step into “Stylus Properties” interface, and tapping “calibration” to start calibrating. You may use an auxiliary USB mouse for stepping into “Stylus Properties” interface.

After the calibration, run “Regflushkeys.exe” command immediately and save calibration parameters. You can either input command “Regflushkeys.exe” in “Start\Run\”or find the program in “\Windows”directory, run it to update registry.


Stylus Properties
?
OK
Double-Tap
Calibration
Double-tap this grid to set the double-tap sensitivity for both the speed and physical distance between taps.
Double-tap this icon to test your double-tap settings. If this icon doesn't change, adjust your settings using the grid above.

Stylus Properties Picture

4.2.4.2 Setting Touch screen sensitivity and speed sensitivity

The identification precision differences between finger touch and pen touch may results in different touch screen identification effects. Pen touch has better identification effect, while finger touch (especially finger pulp touch) gets relatively poorer precision. Therefore, it is recommended to operate with fingertips or pen, especially at four corners and four sides so as to get optimal touch control effect.

Meanwhile, you can get better double-tap touch control effect by setting double-tap sensitivity and physical distance parameter between two taps. Set according to "Double-Tap" selection" in "Stylus Properties". The physical distance between two taps is recommended to be as great as possible for better finger touch effect. Run "Regflushkeys.exe" command after the setting so as to save the updated registry settings.

4.3 Linux Instructions

4.3.1 Linux Application Development

4.3.1.1 Linux Application Environment

The operation environment of VT-HMI application system is a QT/Embedded open system with the following structure:

<table>
<tr><td colspan="3">Qt/Embedded Applications</td></tr>
<tr><td colspan="2">QWS Server-Graphic Event Service</td><td></td></tr>
<tr><td colspan="3">Qt/Embedded</td></tr>
<tr><td>Frame Buffer</td><td>Input Device Driver</td><td></td></tr>
<tr><td colspan="3">Linux Operating System</td></tr>
<tr><td colspan="3">Low-level Hardware Platform</td></tr>
</table>

Users can develop or transplant Qt/Embedded-based applications to HMI platform.

4.3.1.2 Linux Application Operation

- Manual operation

Copy applications to relevant directory and operate by double-clicking.

- Automatic operation

Copy applications to directory /etc/rcS.d and the system will automatically operate during the next system startup.

4.3.2 Linux Image Programming

a) Analyze u-boot and MTD partition to determine programming partition:

u-boot config: include/configs/adstrubog5.h

MTD driver: drivers/mtd/maps/ads-flash.c

```
#define CONFIG_BOOTARGS         "console=ttyS0,38400
SERIALGETTY=ttyS0 "\
                        " SERIALBAUD=38400"                 \
                        " rw root=/dev/ram initrd=0x80800000,5m"\
                        " ramdisk_size=12288 rootfstype=ext2"    \
                        " " CONFIG_MTD_PARTS
```

b) Analyze the configuration files of compilation kernel::

make adstrubog5_defconfig analysis:

cat ./Makefile | grep -rn "defconfig"

actual executable configuration files are

/arch/arm/configs/adsbitsyg5_defconfig

c) mx31 small system programming

download u-boot: tftp 0x84000000 u-boot.bin // to memory

protect off 0xa0000000 0xa003ffff

erase 0xa0000000 +0x40000

cp.b 0x84000000 0xa0000000 0x40000

Download tftp 0x84000000 zImage // to memory

erase 0xa0080000 +0x200000

cp.b 0x84000000 0xa0080000 0x200000

Download ramdisk:

tftp 0x84000000 ramdisk.gz

erase 0xa0280000 +0x500000

cp.b 0x84000000 0xa0280000 0x500000

Download jffs2:

tftp 0x84000000 flashfs1 (tftp 0x84000000 rootfs.jffs2)

erase 0xa0780000 +0x1880000

cp.b 0x84000000 0xa0780000 0x1880000

bootm 0xa0080000 //boot from the kernel

Original parameter configuration:

bootargs=console=ttyS0,38400

SERIALGETTY=ttyS0 SERIALBAUD=38400 rw root=/dev/ram

initrd=0x80800000,5m ramdisk_size=12288 rootfstype=ext2

mtdparts=flash0:256k(boot),256k(bootvars),2m(zImage),5m(ramdisk.gz

),-(flashfs1), wherein initrd designates the storage address of ramdisk

in memory; uboot loads ramdisk images to memory; the ramdisk

images are not compressed but loaded to root file system by the kernel.

Modify root=/dev/mtdblock4 rootfstype=jffs2 noinitrd

set bootargs console=ttyS0,38400

SERIALGETTY=ttyS0 SERIALBAUD=38400 rw root=/dev/mtdblock4

rootfstype=jffs2 noinitrd

mtdparts=flash0:256k(boot),256k(bootvars),2m(zImage),5m(ramdisk.gz

),-(flashfs1)

set zImage cp.b 0xa0080000 0x84000000 0x200000 // convey to

memory from flash

set start "bootm 0x84000000"

set bootcmd "run zImage; run start"

4.3.3 Instructions for Linux Configuration Files

Modification and updating of software configurations are dangerous and may cause system boot failure. Do not modify on your own unless with a good knowledge of each updating files.

4.3.4 start.txt

The system automatically updates and starts scrip without user's modification.

4.3.5 tty_config.txt

Configure debug serial port and baud rate for the device.

- ✧ ${console}: The debug serial port adopted by the device could be set with values such as ttyS0, ttyS1, ttyS2, etc.
- ✧ ${baudrate}: The baudrate adopted by the debug serial port could be 9,600，38,400，115,200, etc.

4.3.6 hw_config.txt

Configure parameters for LCD driven by the device. It functions differently according to different types of device.

Hardware compatibility settings must be kept without random modification.

4.3.7 root_config.txt

Configure items for automatic updating and boot parameters that will be adopted during the boot of updated system, for example: images_to_flash='boot zImage ramdisk.gz flashfs1' is for designating items that need updating.

U-boot image: boot

Linux knernal image: zImage

Linux Ramdisk file system image: ramdisk.gz

Linux jffs2 file system image: jffs2

Files designated by image_to_flash variables must exist in the SD card or USB.

4.3.8 Notice of Touch Screen in Linux

4.3.8.1 Touch Screen Calibration

To get better touch control precision, it is needed to calibrate before using the touch screen, generally get electrified on equipment for the first time. The program prompts for automatic calibration if the touch screen is not calibrated. The system automatically saves calibration parameter after the calibration.

Two methods for stepping into the “calibration” interface are listed below if further calibration is needed:

a) select “Start\Recalibration” command from the menu to step into “calibration” interface.

b) tap “Stylus” icon in “ setting” bar to step into “ calibration” interface.

5 Tips

Waste Disposal

It is recommended to disassemble the device before abandoning it in conformity with local regulations. Please ensure that the abandoned batteries are disposed according to local regulations on waste disposal. Do not throw batteries into fire (explosive) or put in common waste canister. Products or product packages with the sign of “explosive” should not be disposed like household waste but delivered to specialized electrical & electronic waste recycling/disposal center. Proper disposal of this sort of waste helps avoiding harm and adverse effect upon surroundings and people’s health. Please contact local organizations or recycling/disposal center for more recycling/disposal methods of related products.

Comply with the following safety tips:

Do not use in combustible and explosive environment

Keep away from combustible and explosive environment for fear of danger.

Keep away from all energized circuits.

Operators should not remove enclosure from the device. Only the group or person with factory certification is permitted to open the enclosure to adjust and replace the structure and components of the device. Do not change components unless the power cord is removed. In some cases, the device may still have residual voltage even if the power cord is removed. Therefore, it is a must to remove and fully discharge the device before contact so as to avoid injury.

Unauthorized changes to this product or its components are prohibited.

In the aim of avoiding accidents as far as possible, it is not allowed to replace the system or change components unless with permission and certification. Please contact the technical department of Vantron or local branches for help.

Pay attention to caution signs.

Caution signs in this manual remind of possible danger. Please comply with relevant safety tips below each sign. Meanwhile, you should strictly conform to all safety tips for operation environment.

Notice

Considering that reasonable efforts have been made to assure accuracy of this manual, Vantron assumes no responsibility of possible missing contents and information, errors in contents, citations, examples, and source programs.

Vantron reserves the right to make necessary changes to this manual without prior notice. No part of this manual may be reprinted or publicly released in forms of photocopy, tape, broadcast, e-document, etc.

Chengdu Vantron Technology Ltd.
www.vantrontech.com.cn.
Phone: (+86)28-85123930 85123931
85157572 85156320
Fax: (+86)28-85123935
E-mail: sales@vantrontech.com.cn